

WHAT IS CLAIMED IS:

1. An electrolyte membrane which is intended for use in a fuel cell comprising:
a matrix comprising a proton-conducting polymer and
a sheet consisting substantially of an inorganic fiber.
2. The electrolyte membrane according to claim 1, wherein the sheet is a woven or non-woven cloth consisting substantially of the inorganic fiber.
3. The electrolyte membrane according to claim 1, wherein at least a portion of the sheet is implanted in the polymer matrix.
4. The electrolyte membrane according to claim 1, wherein almost the entire sheet is implanted in the polymer matrix.
5. The electrolyte membrane according to claim 1, wherein the inorganic fiber is glass fiber.
6. The electrolyte membrane according to claim 5, wherein the sheet is glass fiber woven cloth.
7. A fuel cell comprising:
an anode;
a cathode; and
an electrolyte membrane disposed between the electrodes, wherein the electrolyte membrane comprises a matrix comprising a proton-conducting polymer and a sheet substantially consisting of an inorganic fiber.
8. The fuel cell according to claim 7, wherein the anode comprises a catalyst capable of generating hydrogen from methanol.

9. The fuel cell according to claim 8 which is intended for use in a direct methanol fuel cell.

10. A method for producing an electrolyte membrane which is intended for use in a fuel cell comprising the steps of:

- obtaining a sheet substantially consisting of an inorganic fiber;
- obtaining a fluid composition comprising a proton-conducting polymer dissolved or dispersed in a solvent;
- impregnating the fluid composition into the sheet; and
- removing the solvent from the composition.

11. A method for producing an electrolyte membrane which is intended for use in a fuel cell comprising the steps of:

- obtaining a sheet substantially consisting of an inorganic fiber;
- obtaining a fluid composition comprising one or two or more monomers capable of polymerizing to form a proton-conducting polymer;
- impregnate the fluid composition into the sheet;
- polymerize the monomer or monomers contained in the composition in the above state; and
- removing the solvent from the composition.

12. A method for suppressing methanol crossover in a fuel cell in which methanol is supplied as fuel comprising the steps of:

- obtaining an electrolyte membrane comprising a sheet substantially consisting of an inorganic fiber and a matrix comprising a proton-conducting polymer; and
- using the electrolyte membrane as an electrolyte membrane disposed between an anode and a cathode of a direct methanol fuel cell.

13. The method according to claim 12, wherein a woven cloth or a non-woven cloth consisting substantially of the inorganic fiber is used as the sheet.

14. The method according to claim 12, wherein an electrolyte membrane is used with at least a portion of the sheet implanted in the polymer matrix.
15. The method according to claim 12, wherein an electrolyte membrane is used with almost the entire sheet implanted in the polymer matrix.
16. The method according to claim 12, wherein glass fiber is used as the inorganic fiber.